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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/081,301	02/20/2002	Rebecca E. Cahoon	BB1201 USDIV	2524

23906 7590 02/11/2003

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EXAMINER

HUTSON, RICHARD G

ART UNIT

PAPER NUMBER

1652

DATE MAILED: 02/11/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/081,301	CAHOON ET AL.	
	Examiner	Art Unit	
	Richard G Hutson	1652	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) Responsive to communication(s) filed on 26 December 2002.

2a) This action is **FINAL**. 2b) This action is non-final.

3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

sposition of Claims

4) Claim(s) 11-27 is/are pending in the application.

 4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5) Claim(s) _____ is/are allowed.

6) Claim(s) 11-13 and 16-27 is/are rejected.

7) Claim(s) 14 and 15 is/are objected to.

8) Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9) The specification is objected to by the Examiner.

10) The drawing(s) filed on _____ is/are: a) accepted or b) objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11) The proposed drawing correction filed on _____ is: a) approved b) disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.

12) The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) All b) Some * c) None of:
1. Certified copies of the priority documents have been received.
2. Certified copies of the priority documents have been received in Application No. ____.
3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.

14) Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) The translation of the foreign language provisional application has been received.

15) Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) Notice of References Cited (PTO-892) 4) Interview Summary (PTO-413) Paper No(s). ____ .
2) Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) Notice of Informal Patent Application (PTO-152)
3) Information Disclosure Statement(s) (PTO-1449) Paper No(s) 3 . 6) Other:

DETAILED ACTION

Applicants second preliminary amendment of the specification and claim 11, 14 and 15, Paper No. 7, 1/2/2003, is acknowledged. Claims 11-27 are at issue and are present for examination.

Election/Restrictions

Applicant's election without traverse of Group I, Claims 1-7 in Paper No. 10 is acknowledged. The traversal is on the ground(s) that examination of Group I, SEQ ID NO: 9 or a sequence encoding SEQ ID NO: 10.

Priority

Applicants amendment of the first line of the specification to state that this application is a divisional of U.S. Application 09/371,056, filed August 9, 1999, whose contents are incorporated by reference and claims the benefit of U.S. Provisional application 60/096,342, filed August 12, 1998, is acknowledged. It is noted that U.S. Application 09/371,056 has issued as U.S. Patent No. 6,403,859 and it is suggested that the priority information be updated to reflect this information.

Information Disclosure Statement

The listing of references in the specification is not a proper information disclosure statement. 37 CFR 1.98(b) requires a list of all patents, publications, or other

information submitted for consideration by the Office, and MPEP § 609 A(1) states, "the list may not be incorporated into the specification but must be submitted in a separate paper."

Applicants filing of information disclosures, Paper No. 2, filed 2/20/2002, is acknowledged. Those references considered have been initialed.

Specification

The disclosure is objected to because of the following informalities: As discussed above, U.S. Application 09/371,056 has issued as U.S. Patent No. 6,403,859 and it is suggested that the priority information be updated to reflect this information.

Appropriate correction is required.

Claim Objections

Claims 14 and 15 are objected to because of the following informalities:

Claims 14 and 15 are each dependent on rejected claim 11.

Appropriate correction is required.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claim 17 is rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

Claim 17 is directed to all possible polynucleotides that comprise at least 400 contiguous nucleotides and remains hybridized with the polynucleotide of claim 11, under a wash condition of 0.1X SSC, 0.1% SDS and 65°C. The specification, however, only provides a single representative species, SEQ ID NO: 9, encompassed by these claims. There is no disclosure of any particular structure to function/activity relationship in the single disclosed species. The specification also fails to describe additional representative species of these polynucleotides by any identifying structural characteristics or properties other than that recited in claim 17, for which no predictability of function is apparent. Given this lack of additional representative species as encompassed by the claims, Applicants have failed to sufficiently describe the claimed invention, in such full, clear, concise, and exact terms that a skilled artisan would recognize Applicants were in possession of the claimed invention.

Applicant is referred to the revised guidelines concerning compliance with the written description requirement of U.S.C. 112, first paragraph, published in the Official Gazette and also available at www.uspto.gov.

Claims 11-13 and 16-27 rejected under 35 U.S.C. 112, first paragraph, because the specification, while being enabling for an isolated polynucleotide that encodes a

pyridoxamine-phosphate oxidase comprising the amino acid sequence of SEQ ID NO: 10, does not reasonably provide enablement for any polynucleotide that comprises at least 400 contiguous nucleotides and hybridizes under 0.1X SSC, 0.1% SDS at 65°C, with a polynucleotide which encodes a polypeptide having 80% sequence identity to the amino acid sequence of SEQ ID NO: 10. The specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the invention commensurate in scope with these claims.

Factors to be considered in determining whether undue experimentation is required, are summarized in *In re Wands* (858 F.2d 731, 8 USPQ 2nd 1400 (Fed. Cir. 1988)) as follows: (1) the quantity of experimentation necessary, (2) the amount of direction or guidance presented, (3) the presence or absence of working examples, (4) the nature of the invention, (5) the state of the prior art, (6) the relative skill of those in the art, (7) the predictability or unpredictability of the art, and (8) the breadth of the claim(s).

Claims 11-13 and 16-27 are so broad as to encompass any polynucleotide (or its complement) that encodes any pyridoxamine-phosphate oxidase that has at least 80% identity to the amino acid sequence of SEQ ID NO: 10 and chimeric genes, vectors and cells, plants, viruses and seeds comprising said polynucleotide and methods of expressing said polynucleotide (claims 11, 16, 18-27) and those polynucleotides that encodes any pyridoxamine-phosphate oxidase that has at least 90% and 95% identity to the amino acid sequence of SEQ ID NO: 10 (claims 12 and 13). Claim 17 is so broad as to encompass any polynucleotide that is at least 400 contiguous nucleotides in

length and hybridizes under 0.1X SSC, 0.1% SDS at 65°C, with a polynucleotide which encodes a polypeptide having 80% sequence identity to the amino acid sequence of SEQ ID NO: 10. The scope of the claims is not commensurate with the enablement provided by the disclosure with regard to the extremely large number of polynucleotides broadly encompassed by the claims, including any polynucleotide that is at least 400 contiguous nucleotides in length and hybridizes under 0.1X SSC, 0.1% SDS at 65°C, with a polynucleotide which encodes a polypeptide having 80% sequence identity to the amino acid sequence of SEQ ID NO: 10.. The claims rejected under this section of U.S.C. 112, first paragraph, place only minor structural limits on the claimed polynucleotides. Since the amino acid sequence of a protein determines its structural and functional properties, predictability of which changes can be tolerated in a protein's amino acid sequence and obtain the desired activity requires a knowledge of and guidance with regard to which amino acids in the protein's sequence, if any, are tolerant of modification and which are conserved (i.e. expectedly intolerant to modification), and detailed knowledge of the ways in which the proteins' structure relates to its function. However, in this case the disclosure is limited to that polynucleotide which encodes a polypeptide having the amino acid sequence of SEQ ID NO: 10.

While recombinant and mutagenesis techniques are known, it is not routine in the art to screen for multiple substitutions or multiple modifications, as encompassed by the instant claims, and the positions within a protein's sequence where amino acid modifications can be made with a reasonable expectation of success in obtaining the desired activity/utility are limited in any protein and the result of such modifications is

unpredictable. In addition, one skilled in the art would expect any tolerance to modification for a given protein to diminish with each further and additional modification, e.g. multiple substitutions.

The specification does not support the broad scope of the claims which encompass all modifications and fragments of any polynucleotide which encodes any pyridoxaamine-phosphate oxidase having the recited amino acid sequence identity, because the specification does not establish: (A) regions of the protein structure which may be modified without effecting pyridoxaamine-phosphate oxidase activity; (B) the general tolerance of pyridoxamine-phosphate oxidases to modification and extent of such tolerance; (C) a rational and predictable scheme for modifying any amino acid residue of a cold-active pyridoxaamine-phosphate oxidase with an expectation of obtaining the desired biological function; and (D) the specification provides insufficient guidance as to which of the essentially infinite possible choices is likely to be successful. Because of this lack of guidance, the extended experimentation that would be required to determine which substitutions would be acceptable to retain the pyridoxaamine-phosphate oxidase activity, as encoded by the polynucleotide claimed and the fact that the relationship between the sequence of a peptide and its tertiary structure (i.e. its activity) are not well understood and are not predictable (e.g., see Ngo et al. in *The Protein Folding Problem and Tertiary Structure Prediction*, 1994, Merz et al. (ed.), Birkhauser, Boston, MA, pp. 433 and 492-495, Ref: U, Form-892), it would require undue experimentation for one skilled in the art to arrive at the majority of those

polynucleotides of the claimed genus which encode a polypeptide having the claimed pyridoxaamine-phosphate oxidase activity.

Thus, applicants have not provided sufficient guidance to enable one of ordinary skill in the art to make and use the claimed invention in a manner reasonably correlated with the scope of the claims including a number of amino acid modifications of the pyridoxaamine-phosphate oxidase of SEQ ID NO: 10. The scope of the claims must bear a reasonable correlation with the scope of enablement (*In re Fisher*, 166 USPQ 1924 (CCPA 1970)). Without sufficient guidance, determination of those polynucleotides having the desired biological characteristics is unpredictable and the experimentation left to those skilled in the art is unnecessarily, and improperly, extensive and undue. See *In re Wands* 858 F.2d 731, 8 USPQ2nd 1400 (Fed. Cir, 1988).

Remarks

No claim is allowed.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Richard G Hutson whose telephone number is (703) 308-0066. The examiner can normally be reached on 7:30 am to 4:00 pm, M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ponnathapu Achutamurthy can be reached on (703) 308-3804. The fax phone numbers for the organization where this application or proceeding is assigned

are (703) 305-3014 for regular communications and (703) 305-3014 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0196.



Richard Hutson, Ph.D.
Patent Examiner
Art Unit 1652
February 10, 2003